

इंटरनेट

मानक



Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

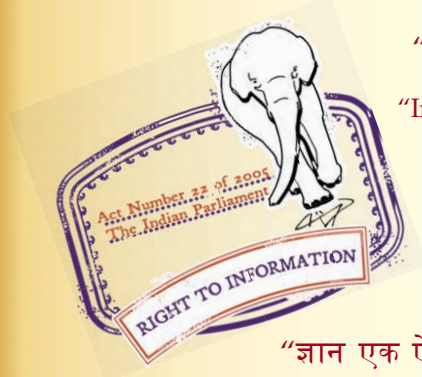
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 8036 (1976): Mild steel transformer cooling tubes [MTD 19: Steel Tubes, Pipes and Fittings]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



BLANK PAGE



IS : 8036 - 1976

Indian Standard
SPECIFICATION FOR
MILD STEEL TRANSFORMER
COOLING TUBES

(First Reprint MAY 1984)

UDC 621.643.2[669.141.24-462.2/.3]:621.314-714.2



© Copyright 1976

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 2

July 1976

Indian Standard

SPECIFICATION FOR MILD STEEL TRANSFORMER COOLING TUBES

Steel Tubes, Pipes and Fittings Sectional Committee, SMDC 22

<i>Chairman</i>	<i>Representing</i>
SHRI J. G. KESWANI	Indian Tube Co Ltd, Calcutta
<i>Members</i>	
SHRI S. C. ANAND	Bharat Steel Tubes Ltd, New Delhi
SHRI K. C. SRIVASTAVA (<i>Alternate</i>)	
SHRI E. ANANDA RAO	Tube Products of India, Madras
SHRI T. SIVASHANKAR (<i>Alternate</i>)	
ASSISTANT DIRECTOR STANDARDS (LOCO), LUCKNOW	Ministry of Railways
SHRI B. BEHERA	Hindustan Steel Ltd, Rourkela
SHRI C. DAS GUPTA (<i>Alternate</i>)	
SHRI B. B. CHAKRAVERTI	Superintendence Co of India (Private) Ltd, Calcutta
SHRI A. K. SHOME (<i>Alternate</i>)	
DR R. K. DUBEY	National Metallurgical Laboratory (CSIR), Jamshedpur
EXECUTIVE ENGINEER, CENTRAL STORES DIVISION NO. 1	Central Public Works Department, New Delhi
SHRI S. K. GUPTA	Indian Tube Co Ltd, Jamshedpur
SHRI D. DUTTA (<i>Alternate</i>)	
SHRI T. N. JHA	Central Boilers Board, New Delhi
SHRI JACOB JOHN	Kalinga Tubes Ltd, Calcutta
SHRI AJIT MOHAPATRA (<i>Alternate</i>)	
SHRI M. T. KANSE	Directorate General of Supplies & Disposals (Inspection Wing), New Delhi
SHRI S. C. KAPUR (<i>Alternate</i>)	
SHRI B. KUMAR	Stewarts & Lloyds of India Ltd, Calcutta
SHRI P. N. CHOWRANGHI (<i>Alternate</i>)	
CDR V. N. MADHAV RAO	Defence Metallurgical Research Laboratory, Hyderabad
SHRI S. MITTAL	Indian Oil Corporation Ltd, Bombay
SHRI R. K. AIRY (<i>Alternate</i>)	
SHRI S. NEELAKANTAN	Zenith Steel Pipes Ltd, Khopoli
SHRI B. A. DESAI (<i>Alternate</i>)	

(Continued on page 2)

© Copyright 1976

INDIAN STANDARDS INSTITUTION

This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(Continued from page 1)

Representing

Members

SHRI GOPAL J. PATEL	Gujarat Steel Tubes Ltd, Ahmadabad
SHRI SHAILESH V. SHAH (<i>Alternate</i>)	
SHRI N. B. ROY CHOWDHURY	Burmah-Shell Refineries Ltd, Bombay
SHRI S. L. ARANHA (<i>Alternate</i>)	
SHRI J. L. SETHI	Public Works Department (Public Health Branch), Government of Haryana, Chandigarh
SHRI A. N. MEHENDALE (<i>Alternate</i>)	
SHRI S. SRINIVASAN	Hindustan Shipyard Ltd, Visakhapatnam
SHRI M. C. KESAVA RAO (<i>Alternate</i>)	
SHRI A. SRINIVASULU	Bharat Heavy Electricals Ltd, Tiruchirapalli
SHRI C. R. RAMA RAO, Director (Struc & Mct) (<i>Secretary</i>)	Director General, ISI (<i>Ex-officio Member</i>)

Indian Standard

SPECIFICATION FOR MILD STEEL TRANSFORMER COOLING TUBES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 April 1976, after the draft finalized by the Steel Tubes, Pipes and Fittings Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 Welded and seamless mild steel tubes are used extensively as transformer cooling tubes and this standard is intended to cover their quality requirements.

0.3 This standard keeps in view the manufacturing and trade practices followed in the country as well as by reputed international tube manufacturers in this field.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements for welded and seamless mild steel tubes having round and elliptical shapes for use in transformer cooling.

2. DESIGNATION

2.1 Round tubes shall be designated by their outside diameter and thickness. Elliptical tubes shall be designated by their major axis, minor axis and thickness.

3. SUPPLY OF MATERIALS

3.1 General requirements relating to the supply of mild steel transformer cooling tubes shall conform to IS : 1387-1967†.

*Rules for rounding off numerical values (*revised*).

†General requirements for the supply of metallurgical materials (*first revision*).

4. MANUFACTURE

4.1 The tubes shall be manufactured from mild steel made by any approved process, which, when analysed in accordance with the methods specified in IS : 228-1959* and IS : 228 (Part III)-1972†, shall show not more than 0.060 percent each of sulphur and phosphorus respectively.

4.2 The tubes shall be manufactured by one of the following processes:

- a) Seamless,
- b) Hot finished welding,
- c) Electric resisting welding, and
- d) High frequency induction welding.

5. DIMENSIONS

5.1 For round tubes, the dimensions shall be as under:

<i>Outside Diameter</i>	<i>Thickness</i>
mm	mm
21.3	1.60, 2.00
26.9	1.60, 2.00
33.7	1.60, 2.00
38.1	1.60, 2.00
42.4	1.60, 2.00
48.3	1.60, 2.00
50.8	1.60, 2.00
60.3	1.60, 2.00

5.1.1 The tolerance on thickness shall be ± 8 percent and on the outside diameter ± 0.50 mm.

5.2 For elliptical tubes, the dimensions shall be as under:

<i>Major Axis</i>	<i>Minor Axis</i>	<i>Thickness</i>
mm	mm	mm
28	21	1.60, 2.00
30	19	1.60, 2.00
33.5	16.5	1.60, 2.00
35.5	14	1.60, 2.00
38	25	1.60, 2.00
40	23	1.60, 2.00

*Methods of chemical analysis of pig iron, cast iron, plain carbon and low alloy steels (revised).

†Methods of chemical analysis of steels: Part III Determination of phosphorus (alkalimetric method) (second revision).

Major Axis	Minor Axis	Thickness
mm	mm	mm
44	19	1.60
54	25	2.00
56	36.5	2.00
60	30	2.00
71.4	21	1.20, 1.40, 1.60, 2.00
75	15	1.60, 2.00

5.2.1 The tolerance on thickness shall be ± 8 percent. Tolerance on outside dimensions shall be ± 0.50 mm for sizes up to and including 50 mm, and ± 1.0 percent for sizes above 50 mm, and measurement shall be taken 150 mm from the cut ends.

6. LENGTH

6.1 The tubes may be supplied in lengths of 4 to 7 m. If ordered in exact lengths as agreed to between the supplier and the purchaser, the tubes shall be subject to $\begin{matrix} +6 \\ -0 \end{matrix}$ mm tolerance.

7. STRAIGHTNESS

7.1 Unless otherwise agreed to between the purchaser and the supplier, round tubes shall not deviate from the straight line by more than $1/600$ th of any length measured at the centre of that length. Elliptical tubes shall not show permanent twist of more than 5 degrees and shall not deviate from straight line by more than $1/600$ th of any length measured at the centre of that length along horizontal plane.

8. MECHANICAL TESTS

8.1 The following tests shall be carried out on the sampled tubes. Tubes shall be sampled in accordance with IS : 4711-1974*.

8.1.1 *Tensile Test* — The test shall be carried out in accordance with IS : 1894-1972†. The test shall show a minimum ultimate tensile strength of 32MPa (32 kgf/mm²). Elongation percent on a gauge length of $5.65\sqrt{S_0}$ (where S_0 is the cross-sectional area of the test specimen) shall not be less than 20 percent.

8.1.2 *Bend Test* — The finished tubes shall be capable of withstanding the bend test without showing any signs of fracture or failure when carried out in accordance with IS : 2329-1963‡. The tubes shall not be filled for this test.

*Method of sampling of steel pipes, tubes and fittings (first revision).

†Method for tensile testing of steel tubes (first revision).

‡Method for bend test on steel tubes.

8.1.2.1 Round tubes shall be capable of being bent cold, with the weld at 90 degrees to the plane of bending, through 180 degrees round a former having a radius, at the bottom of the groove in the plane of bending, equal to six-times the outside diameter of the tube.

8.1.2.2 Elliptical tubes shall be capable of being bent cold, with major axis in the plane of bending through 180 degrees round a former having a radius, at the bottom of the groove, equal to four times the outside length of major axis of the tube.

9. RETESTS

9.1 Should a tube selected for test fail in any one or more of the tests specified, two further tests of the same kind shall be made from the same or another tube at the manufacturer's discretion.

9.2 If both the repeat tests are satisfactory the tubes shall be accepted provided that in all respects they comply with the requirements of this standard. If failure occurs in either of the retests, the tubes represented by these test pieces shall be deemed not conforming to this standard.

10. HYDRAULIC TEST

10.1 Each tube shall be hydraulically tested at the manufacturer's works.

10.2 Unless otherwise agreed to, each round tube shall withstand a test pressure 490 N/cm^2 without showing defects of any kind. The pressure shall be applied by approved means and maintained sufficiently long for proof and inspection. The testing apparatus shall be fitted with an accurate pressure indicator, and provision shall be made for its accuracy to be verified by the purchaser, if required.

10.3 Unless otherwise agreed to, each elliptical tube shall be tested by immersing the tube in a tank containing water (in which an emulsion oil is added to avoid rusting of tubes) and passing air from the tube at test pressure of 69 N/cm^2 without showing defect of any kind. The weld shall be placed facing upwards and leakage through the water producing either visible water displacement or minute bubbles escaping from the weld interface. The pressure shall be maintained at least for 30 seconds for this purpose.

11. MARKING

11.1 The tubes shall be marked with the following particulars:

- a) Manufacturer's name or trade-mark, and
- b) Outside diameter and thickness.

11.1.1 The tubes may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

12. PROTECTION AND PACKING

12.1 Unless otherwise specified in the order, protection of tubes against corrosion shall conform to IS : 1153-1957*. Where tubes are bundled for transport, all qualities of tubes shall be packed in accordance with IS : 7705-1975†.

*Specification for temporary corrosion preventive, fluid, hard film, solvent deposited.

†Code of practice for packaging of precision and special purposes steel tubes.



AMENDMENT NO. 1 NOVEMBER 1982
TO

IS:8036-1976 SPECIFICATION FOR MILD STEEL
TRANSFORMER COOLING TUBES

Addenda

(Page 4, clauses 5.1 and 5.2) - Add the following new note after 5.1 and 5.2:

'NOTE - The dimensions may also be as mutually agreed to between the manufacturer and the purchaser.'

(Page 6, clause 8.1.2.2) - Add the following new sentence at the end of the clause:

'Distortion will be permissible provided no cracks appear at the position of maximum bending.'

(SMDC 22)



TO

IS:8036-1976 SPECIFICATION FOR MILD STEEL
TRANSFORMER COOLING TUBES

Alterations

(Page 4, clause 4.1) - Substitute the following for the existing clause:

'4.1 The tubes shall be manufactured from mild steel made by any approved process.

4.1.1 The steel shall have not more than 0.060 percent each of sulphur and phosphorus respectively.

4.1.2 The analysis of steel shall be carried out either by the method specified in IS:228* and its relevant parts or any other established instrumental/chemical method. In case of dispute the procedure given in IS:228* and its relevant parts shall be referee method. However, where the method is not given in IS:228* and its relevant parts, the referee method shall be as agreed to between the purchaser and the manufacturer.'

(Page 4, foot-notes with '*' and '+' marks) - Substitute the following foot-note for the existing foot-notes:

'*Methods for chemical analysis of steels (issued in several parts).'

(SMDC 22)